Seniors and Disasters: A Synthesis of Four Canadian Case Studies

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Introduction:

This report presents a synthesis of four case studies commissioned by the Public Health Agency of Canada on the topic of seniors and emergency preparedness and response. Each focuses on a natural disaster that has occurred in Canada since 1995. Collectively, they include:

- Two floods - the Saguenay flood, which occurred in Quebec in 1996, and the Red River flood which took place in Manitoba in 1997;
- The impact on Quebec of the 1998 ice storm*; and
- "Firestorm 2003", which is the descriptor given to the much larger than usual number of wildfires and interface fires (i.e. fires that occur at the boundaries between wilderness and human settlements) that occurred in the forests of British Columbia in 2003.

The synthesis begins with discussion of selected physical features of the four disasters. Burton, Kates and White's (1978) seven hazard characteristics (magnitude, frequency, speed of onset, temporal spacing, duration, extent, and dispersion) provide a framework for this first "stage setting" exercise. As Lindsay and Hall (2006) note in the introduction to their paper about the Red River flood, "understanding the physical characteristics of a hazard impact helps explain and contextualize the accompanying social consequences" (p. 2).

The first characteristic to be discussed is the season of the year in which the four disasters occurred. In Canada, winter tends to be harsh in many parts of the country rendering the season of the year an important consideration, both in terms of defining some of the activities that disaster victims will need to engage in and placing constraints on response and recovery activities. Attention turns next to exposure statistics for the total population and for seniors. This is followed by some information about the communities and/or region chosen by the case study author for detailed examination (e.g. urban, semi-rural, rural; experience with previous disaster situations). The section concludes with a brief description of key local area research studies that have been used by the case study authors to inform and support their discussion about the impact of the disaster on seniors.

Details of the physical features of each disaster, organized according to Burton, Kates and White's (1978) schema, are presented in point form in the summaries of each case study that can be found in Appendix 1 of this report. It is recommended that the reader glance at these before or in conjunction with reading Section 1.

Section 2 introduces the "meat" of the report. It begins with presentation of mortality rates for the general population and for seniors, which as it turns out were minimal in each of the four disasters. Attention turns next to the impact of each disaster on seniors' health and well-being. Since well-being is affected by the availability and condition of housing, roads, public transportation, electricity, sewage lines and other infrastructure, data highlighting damage to property and infrastructure, and business and industry are included in the summaries of each case study in Appendix 1. Again, the reader is advised to glance at the summaries in conjunction with reading the material in the section.

* The 1998 ice storm occurred in Eastern Ontario, Quebec, Northern New York State, New England and part of the Maritimes.

The focus of Section 3 is on emergency preparedness and response targeted explicitly to seniors in each disaster situation as well as on identification of gaps in planning and activities in the early hours and days after the disaster struck. More generic strengths and gaps identified in the case studies as having occurred during the response phase are highlighted in the summaries in Appendix 1.

Section 4 also is focused on strengths and gaps in emergency-related activities as they relate to seniors, this time during the recovery phase. The theme of section 5 is the contribution of older persons in each disaster situation. Section 6 presents what were, to this author, some unexpected outcomes. Section 7, the last of the substantive sections, is concerned with the recommendations that are included in the case studies. A brief concluding section follows.

Throughout this report, as in the case studies, the terms "seniors", "the elderly" and "older persons" refer to individuals aged 65 and over.

1. Physical Characteristics of the Four Canadian Disasters

In terms of Burton, Kates and White's (1978) schema all four of the case studies may be described as rare large magnitude seasonal hazards with widespread, disperse damage over a long duration.

Season of the year

Three of the Canadian disasters occurred in the spring and summer months (the two floods and the forest fires), while the fourth (the ice storm) occurred in winter. In the latter case, the risk to seniors (and other segments of the population) was compounded by the massive and, in some parts of the province of Quebec, long-standing (up to a month) power failure that followed the storm. Coming at a time of the year when the average temperature was -9ºC, avoiding hypothermia became a major activity for many residents of Quebec. The substitutes for electricity-powered furnaces (and stoves and ovens) that people turned to (e.g. wood stoves, oil lamps, fireplaces, camp stoves, liquid-fuel-fired heaters, barbecues and fondue sets) resulted in increased rates of carbon monoxide poisoning, burns and other injuries. Statistics cited in the case study of the ice storm indicate that one-quarter to one-third of seniors who had generators and combustion appliances used them incorrectly; only 14.7% had carbon monoxide detectors in their home. Other risky behaviour engaged in by community-dwelling seniors during the ice storm and its aftermath included scraping ice off their roof (26.7%), pruning trees (25.4%) and eating perishable foods that had been left unrefrigerated (5%).

Food spoilage would, of course, be a greater risk factor for illness in the case of power-outages that occur in summer. Should such happen, reserve generators need to be in place in nursing homes and hospitals to ensure that refrigeration and air conditioning is maintained. While Canada is noted for its harsh winter weather, there are parts of the country that reach quite high temperatures for several days or weeks at a time during the summer months. A heat wave coupled with a power failure could result in a high risk situation for frail elders living in larger institutional settings which normally have internal climate control systems in operation. A heat wave would place in jeopardy seniors who live in smaller congregate settings such as group homes, or assisted living facilities, some of which may lack air conditioning. Many older adults living independently or semi-

independently in single family dwellings and apartments may also be at risk because much of the housing stock occupied by seniors is not equipped with air conditioning.

Total Population and Number of Seniors Impacted

Compared to natural disasters that occur in the developing world, the number of persons impacted by the four Canadian disasters is relatively small. Still, in terms of our population, the numbers are significant. For example, in the case of the Quebec ice storm 4,826,586 or 66.9% of the general population of Quebec were exposed. The total was 1,243,335 in the Montérégie region, the area most severely affected by the ice storm. Of these, 128,960 (10.3%) were aged 65+. In the case of the Quebec flood, 172,345 were exposed in the Saguenay region, the area hardest hit by the 1996 flood. Of these, 18,300 were aged 65+. A total of 109,000 in the city of Kelowna were threatened by the Okanogan Mountain fire, 19,620 (18%) of whom were aged 65+.

Case Study Communities and Data Sources

In two of the case studies, the authors have chosen to focus on specific communities. In the case of the Saguenay flood, these included the rural municipalities of Ferlandet-Boilleau and L'Anse-Saint-Jean and the City of Saguenay (formerly the municipalities of Jonquier, La Baie, Chicoutimi and Laterrier). In her description of the response and recovery activities of these communities, Maltais (2006a) provides rich detail and graphic examples derived, from studies she and colleagues conducted comparing elderly flood victims and non-victims.

Cox (2006) focuses on the City of Kelowna and on the two unincorporated towns of Barriere and Louis Creek in her description of the British Colombia forest fires of 2003. Her case study is supported by data collected in a two-year ethnographic study of residents of the latter two communities and in a subsequent study she conducted in which care providers in those communities and in Kelowna were interviewed specifically about emergency preparedness and response with respect to seniors.

The Red River flood and the Quebec ice storm reports present response and recovery information aggregated at the regional level, although there is some mention in the case study of the Red River flood of recommendations contained in a City of Winnipeg report. The City of Winnipeg also gets special mention in the Red River case study report for its flood protection activities which enabled it to successfully weather the 1997 flooding.

Table 1 – Selected Physical Characteristics and Previous Disaster Experience, by Disaster Event, PHAC Canadian Case Studies

Event/ Communities or region focused on in case study	Total population of hardest hit area	% aged 65+	Nature of area impacted	Previous experience with disasters
1996 Saguenay Flood - Ferland-et-Boilleau - L'Anse-Saint-Jean - City of Saguenay	172,345	10. 6%	Urban, semi urban and rural municipalities; population concentrated in urban areas	- previous severe spring thaws and flooding - Mudslide 1971 - Earthquake 1988
1997 Red River Flood			18 rural municipalities	6 other significant floods between 1826 (the largest) and 1997 (3rd largest)
1998 Quebec Ice Storm - Montérégie Region	1,243,335	10.3%	200+ municipalities + some large rural areas	- previous severe spring thaws and flooding - PCB plant fire 1988 - Used tire depot fire 1990
2003 BC Firestorm -City of Kelowna - Barriere and Louis Creek	109,000 3200	18% na	Urban Unincorporated towns	- on average 2,000 wildfires and 1 interface fire in the province per year

With respect to the 1997 flood's impact on seniors, the authors - Lindsay and Hall (2006) - rely heavily on data from a sub-study of the Aging in Manitoba study. One of only a very small number of studies worldwide that contain pre and post-disaster data on seniors (see Appendix 2 for a listing of these), the specific sub-study that informs the Red River case study was comprised of 102 of the Aging in Manitoba participants. Each had been interviewed 10 months before the flood, as part of a general Aging in Manitoba participant follow-up. They were interviewed again 10 months after the flood by Havens and Hall (1999) and 69 of them again in 2001 – four years post-flood. This sub-study is unique in the literature in having data that allows comparison over several points in time, of persons living in the affected region who had differing degrees of exposure to the flood. A third key feature of this study is that it is able to link interview data with actual health service utilization data.

The ice storm case study (Maltais, 2006b) also benefits from research conducted by its author. Respondents in one of the studies referred to in detail included 24 seniors from the Montérégie region who had been without electricity for at least 21 days during the ice storm (Maltais, Robichaud and Simard, 2001). Half of the participants in this qualitative study conducted 18 months after the storm, lived in urban centres and half in rural communities; one third had remained in their home throughout the blackout, one-third had moved in with family, and one third had experienced life in an emergency shelter. Additional data cited in the case study derive from a study Maltais and colleagues conducted in which professionals were asked for their recommendations on how to improve crisis and stress management with respect to seniors exposed to natural disasters.

2. Impact on the General Population and on Older Persons

Fatalities – Few but with Disproportionate Representation of Older Persons among Decedents

In contrast to floods, and other natural disasters that have occurred in other parts of the world, the number of fatalities directly attributable to the four Canadian disasters is small. In the case of the Saguenay flood, the case study report does not provide figures for the general population but other sources place the number of deaths at 10 – all as a result of being caught in mud slides. The report states that there were no deaths among seniors that were directly attributable to the flood. The same seems to be true among seniors exposed to the Red River flood. Mortality was also minimal in the BC Firestorm. Even among the very frail – i.e. relocated home care and nursing home patients - there were only two deaths among those affected by the Okanogan Mountain fire. One of these decedents was an individual who was receiving palliative care before being evacuated.

Across the four Canadian case studies the highest number of deaths (n=30) resulted from the Quebec ice storm. As in Hurricane Katrina and many other disasters (Hutton, 2006), a large proportion of the decedents – half to be exact - were persons aged 65+. Underscoring the point that where deaths occur in a disaster, older adults are disproportionately represented, it should be noted that of the 18 deaths that occurred in the Montérégie region, the region most severely affected by the Quebec ice storm, eight were aged 65+ and five were aged 55-64 (i.e. 72% were aged 55+). It should also be noted that while there was a general increase in mortality rates in January and February 1998 compared to the same months in 1997, the increase was greater among seniors than among younger persons.

Impact on Senior's Health and Well-being

Table 2 summarizes what is known about the impact of each of the four Canadian natural disasters on senior's physical and mental health, perceived social and economic well-being, and quality of life. Data include self-reports and, in the case of the Saguenay flood, the perceptions of health and social care professionals.

The two flood case studies and the ice storm study all indicate that among community dwelling elderly, remaining at home is a risk factor for new physical health problems (e.g. high blood pressure; stomach and respiratory problems, fatigue and physical exhaustion). The ice storm study sensitizes us as well to the possibility of carbon monoxide poisoning, burns and other injuries as seniors attempted to keep warm, cook, and light their homes in the absence of electricity. It also draws attention to the risk of falls from such risky

behaviour as attempting to remove ice from the roof or pruning trees. Evacuation and relocation to a shelter appears to be stressful, not just physically but also emotionally. But paradoxically, the group most impacted by the Manitoba flood – those who had been evacuated or had received notices, showed gains in self-rated health and in cognitive functioning. Perhaps this resulted from their having come to the attention of medical staff and received treatments for conditions that heretofore had not been treated. Perhaps the improvement was a result of the intellectual challenges that the flood brought to their lives and the satisfaction they derived from coping with these. Lindsay and Hall (2006) note in their report that in some studies of natural disasters (e.g. Ollendick and Hoffman, 1982) some victims have identified positive outcomes such as moving to healthier living situations or making new friends. They go on to point out that perceiving some good from the event has been associated with lower rates of post-disaster stress (Tobin and Ollenburger, 1996). The narratives of the Manitoba flood victims contain a number of examples of perceived benefits of the flood experience. Among those cited by Lindsay and Hall are: a coming together of the community, reconnecting with family, property replacement or renovation, and the acquisition of new knowledge on how to cope with recurrent flooding.

In summarizing the narratives, Lindsay and Hall note that while emotional stress was the major health effect described by the elderly respondents, it was perceived to have been a short term effect. The general impression that is conveyed in their report is that the flood had few, if any, lasting negative effects on Manitoba seniors. The pre-post analysis of the quantitative data gathered in the Red River flood sub-study has however not yet been completed so, "the jury is still out". That is, the long term impact of the Manitoba flood may turn out to be less positive than anticipated by Lindsay and Hall. As can be seen in Table 2, in the case of the Saguenay flood, at 8 year follow-up post-traumatic stress disorder (PTSD) scores were significantly higher among elderly flood victims than among controls.

Unfortunately there is a dearth of long term follow-up studies of elderly disaster victims. Until a sizable number of these are conducted, and multi-variate analyses are performed on the data, it will not be possible to determine the veracity of the two conflicting theoretical perspectives: the "diminished resources" perspective and "inoculation theory". The former postulates that older persons are more at risk than younger adults because they lack the capacity to cope as a result of age related physical and mental changes and loses. The latter theory (Ferraro, 2003; Knight, Gatz and Heller, 2003) suggests that because over their life time they have had to cope with many challenges including in some cases, other natural disasters, they will have experience to bring to bear on a new disaster situation and be in a better position to deal with it than younger persons.

Lindsay and Hall also mention a third perspective which they term the "exposure perspective". This viewpoint, they state and referencing Friedsam (1962), suggests that older persons are particularly at risk during disasters because they are less likely than younger adults to receive warnings, are more reluctant to leave their homes, and resist change to their daily pattern of activities. To be sure there were some portrayed in the media during Hurricane Katrina who fit this image, but as several of the authors of the case studies point out, seniors are not a homogeneous group. Their likelihood of receiving warnings and/or ability to cope with disasters will vary as a function of their socio-economic status, gender, degree of social support, housing and living arrangement, health and functional status, education, etc. As Cox (2006) notes with respect to the absence of deaths, visits to the emergency ward, or required relocation to shelters among Kelowna home care clients, all

were evacuated from the most affluent part of the city. "The story might have been very different if the fire threatened some of the apartments in Kelowna that house low-income seniors who may not have support networks and resources available".

Table 2 – Short to Medium Term and Long Term Impact of Disasters on Seniors Health and Well-being, by Disaster Event, PHAC Canadian Case Studies

Event/Respondent type	Short and Medium Term			Long Term
	Physical health	Mental health	Other	
1996 Saguenay Flood Professionals	- new health problems (e.g. high blood pressure, physical exhaustion; stomach and respiratory problem)	-psychological distress, stress, PTSD symptoms, psychological exhaustion	-financial burden -change in timing of life events (e.g. postponed retirement) - marital tension and family conflict - giving up leisure activities	
Seniors	-fatigue, sleep disturbance	-fear of theft and vandalism - fear of being flooded again - various worries (family, homes, animals, etc.)	-felt less financially secure -had reduced quality of life	At 8 years follow-up PTSD symptom scores and depression scores significantly higher in flood victims (n=62) than in controls (n=44)
1997 Red River Flood AIM study participants living in flooded area interviewed in 1996, 1998, 2001 - Group 1 – seniors not affected by the flood - Group 2 – affected through others (family, community) -Group 3-at risk of evacuation or actually evacuated	- at 8 months follow-up, qualitative data indicated some who experienced temporary moves had sleep, eating and activity disturbance - 1996-1998 comparison showed gains in self-rated health in Group 3, decline in activity of daily life, increase in chronic health problems and no change in prescription drug use	- at 8 months follow-up some in Groups 2 and3 reported stress and worry in their narratives - bivariate and multi-variate analyses showed Group 3 to have higher levels of perceived stress but to be least likely to show cognitive decline		- at 4 years follow-up none felt that their current health conditions were related to the flood experience; none reported current problems with housing repair, financial problems or family disruption related to the flood -comparison of pre-flood and 2001 quantitative data is not yet complete

	-logistic regression of variables that changed pre to post-flood showed gender to be best predictor of ADL decline and social support was the only significant predictor of decline in instrumental activity of daily life			
1998 Quebec Ice Storm Seniors who remained in their homes	-physical health problems		- injury/illness from incorrect use of generators and combustion appliances; risky behaviour (e.g. ice removal from roof; pruning trees; eating unrefrigerated food)	
Seniors who resided in shelters	- physical health problems	-mental health problems		
2003 BC Firestorm -evacuated nursing home patients (n=100; Kelowna)	- at 6 weeks post-evacuation increase in rate of flu and colds	- some depression at 6 weeks post-evacuation		
-home care clients (Kelowna)				

3. Emergency Preparedness and Response: Strengths and Gaps

As can be seen in the summaries of the four case studies presented in the Appendix to this report, emergency preparedness and response was very much in evidence in each of the affected jurisdictions. However, as shown in Table 3, the case studies documented relatively few of these as being specifically targeted to seniors and revealed several important gaps. The gaps included: lack of plans for evacuation of care facilities (a situation now remedied in Manitoba); problems identifying and contacting frail community-dwelling elders who were not current home care clients; interruptions and difficulties in delivering home care; and problems with intake and triage resulting in placement of seniors in temporary shelters where they were mixed with infants and children, had to sleep on the floor or in cots in a care facility gymnasium that lacked comfort and standards of good hygiene.

Table 3 – Examples of Emergency Preparedness and Response Targeted to Seniors and Gaps in Planning or Response Identified in PHAC Canadian Case Studies

Event	Emergency Preparedness and Response Targeted to Seniors	Gaps in Planning or Response
1996 Saguenay Flood	• Old age homes included in "Fire safety cover plan" • Basic health and social services provided (e.g. BP and blood sugar checks; assistance in applying for compensation • Home visits to all seniors • In-home support provided	• Lack of privacy, water, electricity in temporary shelters reported by some seniors
1997 Red River Flood		• Lack of News Releases or PSAs targeted to seniors or other vulnerable populations • Lack of guidelines and procedures for evacuation of care facilities
1998 Quebec Ice Storm	• Shelters for frail or ill seniors opened in half of the acute hospitals in the region • CLSCs contacted their home support clients as soon as storm hit; clients without adequate resources referred to Residential and Long-term Care Centres	• Conditions in CHSLDs not optimal for seniors • System for locating vulnerable OP who were not currently CLSC home care clients was inadequate • CLSCs lacked auxiliary heating and lighting • Lack of coordination between municipalities
	(CHSLDs) and hospitals	and CLSCs • Problems with intake and triage (e.g. some seniors mixed with infants and children; lack of beds for seniors) • Most CHSLDs did not have internal emergency response plans
2003 BC Firestorm		• Few seniors had a plan of what they would take with them in an emergency • Interruptions/difficulties in delivering homecare

4. Recovery: Strengths and Gaps

There were virtually no examples in the case studies of recovery strategies or activities that were specifically targeted to seniors. However, Maltais' (2006a) paper describing the Saguenay flood draws attention to two problems experienced and reported by seniors that likely apply to the other three disasters as well. One concerned the complexity of procedures for applying for financial compensation, which were difficult for seniors to comprehend and deal with (this was mentioned by Cox (2006) with respect to her rural respondents). The second was having to make multiple moves (e.g. from home to emergency shelter and/or to home of family member and/or to one or more rental units). Cox (2006) also describes problems that likely cut across the four Canadian disasters, although they were not specifically mentioned in any of the other papers. These included:

- **Communication obstacles** – older people in the rural communities experienced difficulties in securing permits, purchasing supplies and undertaking other activities necessary to rebuild their homes because they did not have access to a telephone. Unlike younger individuals, Cox notes, they did not have a cell phone but rather, had relied on landlines that were inoperable as a result of the forest fire. While computers and Internet access had been set up, these communication devices were not familiar to them and in any case, required travel to another town to access. Literacy was also a problem for some.

- **Transportation obstacles** – lacking a car of their own, and public transportation being non-existent, it was difficult for rural seniors to travel back and forth from the community where they had temporarily been relocated, the burned out town in which their home was located and which they were attempting to rebuild, and the government offices which were located in a third community.

- **Cultural disconnect** – non-residents controlled much of the recovery process and were unaware of local needs and customs. They also tended to be younger individuals who may well have lacked sensitivity to the needs and concerns of the seniors who had lived for many years in the community and who had a long term attachment to it.

- **Gender split** - the decision makers in the long-term recovery process were mostly male and disaster-related resources were focused mainly on job creation. Cox draws attention to the fact that females providing unwaged service to their family had needs for psycho-social support but they and their needs were largely invisible or ignored.

5. Contributions of Older Persons

Each of the four case studies provides examples of the contribution individual older persons made to their community. These included serving as a volunteer in a day care centre; helping out in a shelter; serving on a committee that provided technical and moral support to other disaster victims and advocating for them with various levels of government; providing advice and assistance concerning rebuilding; hauling sandbags, etc. The case studies also note that some seniors focused mainly on helping their own family, for example by providing shelter for a few days or several weeks for the children and/or grandchildren. The authors of two of the case studies explicitly note, however, that generally seniors were viewed more as beneficiaries of recovery operations than as partners in developing and carrying them out.

6. Unexpected Outcomes

From the perspective of the present writer, unexpected outcomes included:

- older persons' reports of having to cope with their neighbours' jealousy or prejudices when they received financial aid as a result of having been a flood victim (source: Saguenay flood case study)
- data showing dissatisfied older flood victims to have had more fragile mental health than controls (source – Saguenay flood case study)
- data showing cognitive decline and decline in self-reported health ratings to be inversely related to degree of disaster impact (source: Red River flood case study)
- absence of significant differences in health care utilization among persons with varying exposure to disaster impact (source: Red River flood case study)
- degree of concern of disaster victims for well-being of livestock and pets (sources: BC forest fire and Quebec ice storm case studies)

- operator's apparent surprise at offer of assistance by regional health authority with evacuation of residents of a small private home for frail elders (source: BC forest fire case study)
- evacuees being deprived of services by virtue of being relocated to another community (source: BC forest fire case study)
- generally, the tendency for frail elders to be left out of the priority category in emergency and disaster planning in Canada and the lack of consideration for their special needs in triage and placement.

7. Best Practices and Recommendations

The case studies contain a number of examples that could be included in a compendium of best practices as well as many recommendations. The most extensive set of recommendations has been provided by Maltais (2006a, b, c). Included in her case study of the Saguenay flood (Maltais, 2006a) are two tables containing professionals' recommendations. The first (Table 11), entitled "Preventive steps to take when implementing emergency response measures", groups the recommendations according to the three stages of the disaster cycle: planning, management, and follow-up. The second table (Table 12) contains recommendations for the planning, management and follow-up stages grouped according to specific target groups. These groups include: disaster victims, individuals not directly affected by the disaster, municipal authorities, community agencies, CLSCs; government departments and agencies, charitable organizations, and the media. There are 3 to 11 recommendations for each group. All of the recommendations in the two tables are generic in their wording. That is, they are not directed to specific vulnerability groups in the case of victims or to particular types of government departments (e.g. health, housing, social welfare).

The same is true of a set of recommendations (Table 13) that derive from older persons themselves. Like the professionals' recommendations, they are grouped by stage in the disaster cycle ("before a disaster occurs", "while an emergency is in progress", "after an emergency response is over") and by target group (disaster victims, responders and community organizations, municipalities, governments).

Parallel sets of recommendations are included in Maltais' (2006b) case study of the Quebec ice storm. In this paper Tables 11-15 contain senior's recommendations to individuals, responders, municipalities, and government – with separate sets for those in rural and those in urban settings; Tables 16-18 present the recommendations of workers who contributed to emergency response activities during the ice storm.

Noticeable by its omission, especially in the sets derived from older adults, is any mention of "older people" other than that they should be helped by the youngest, most resourceful people (see Maltais, 2006a, Table 13).

While some of the recommendations to disaster victims would certainly apply to all seniors, many presume the cognitive and physical skills and resources that would apply mainly to those who would be termed by gerontologists "the very well elderly" – i.e. people living independently or even semi-independently who are able to follow such recommendations as: "make a plan for what you will do in an emergency", "make sure that your environment is safe", "take training courses on how to react in difficult situations,

such as natural disasters"; "take courses in rescue and first aid", and "purchase emergency equipment". While such self-help information is useful, it obviously would not be applicable to those individuals living at home who are functionally at stages between being "very well" and being sufficiently frail to qualify for publicly-funded home care.

The needs of these "in between" groups, as well as home care and institutional care recipients, are better addressed in a table prepared by Malais (2006c) that combines recommendation contained in 18 documents by various authors and seniors' and/or disaster relief agencies (e.g. National Advisory Council on Aging; The American National Red Cross). For example, this document contains a self-care directive to seniors for the pre-disaster phase that advises them to:

> Set up a personal support network that will be there in an emergency to make sure that you are all right and provide help if necessary (friends, acquaintances, family members, etc.). Since home care services may not be available after a disaster, ensure that the help network is made up of people other than the home care employees.
> (The American National Red Cross, 2006b).

The corresponding section targeted to responders commences with a recommendation to:

Ask seniors living in disaster-prone communities to become useful resources in pre-disaster interventions, by having them share their experiences and adaptation strategies. (Norris and Murrell, 1988).

This recommendation recognizes that seniors can play an important role in emergency and disaster response preparation, a theme that is prominently featured in the recommendations of Lindsay and Hall in their Red River flood case study.

Other entries in the Maltais table based on her literature review address the special needs of seniors who have chronic illnesses that need to be managed on an ongoing basis; attempt to ensure that seniors are treated with dignity and respect; that they are targeted by community rebuilding efforts and, that they receive mental health support.

This table, in my opinion, should be "must" reading for all health and social care workers in contact with seniors as well as all emergency response workers and agencies.

There is also useful information in the set of recommendations developed by Cox, based on her study of the 2003 BC Firestore. These could and should be added to Maltais' table as they do not duplicate what it currently contains. Cox organized her recommendations so they extend from the planning stage, through response to recovery. Each recommendation is prefaced by a description of the issue. For example the issue that precedes Recommendation 5 states:

> The losses incurred as a result of disasters include both material and symbolic losses. Older adults' response to these losses is variable and can include resiliency or increased vulnerability. *Recommendation*: Disaster recovery plans should include an acknowledgement of both material and symbolic losses and plan for the provision of support to address both and for variable response of older adults to such losses.

Other key recommendations from Cox's list that are not currently included in Maltais' literature review table, or that if in it could benefit from expansion, include:

- Ensuring the availability of transportation – which as Cox points out, is of primary concern in rural areas.
- Sheltering elderly evacuees in ways and with services that maintain existing support networks and neighbourhood structures
- Developing ways that senior evacuees with restricted mobility and/or independence can engage in activities providing social connection and meaningful engagement.
- Creating sites where evacuees can gather socially away from the hustle and bustle of the reception centre (some seniors may find the reception centre overwhelming and disorienting).
- Overcoming transportation and communication barriers that may disproportionately disadvantage seniors during the recovery stage. One suggested way of doing this is through 'one-stop shopping' options that facilitate access and minimize bureaucracy.
- Incorporating an age analysis and a gender analysis in order to ensure proportionate representation of older persons and women in decision making and in receipt of resources.
- Recognizing the heterogeneity of the seniors population with respect to their willingness and capacity to participate in disaster relief and recovery activities.
- Developing ways of identifying and planning for lower-income adults living in the community who may have limited resource and support networks and who may lack the necessary resources to re-establish themselves following a disaster.
- Assisting families to make informed choices about caring for frail elderly at home during disasters and emergencies.
- Minimizing the number of moves required of frail elders and thus, the potential of relocation stress
- Ensuring that evacuees and staff that accompany them receive appropriate levels of support when evacuation is to communities not directly affected by the disaster.
- Identifying strategies for evacuating and caring for cognitively impaired elders including retaining as many as possible of the elements of the residential environment that is familiar to them.

The recommendations contained in the Lindsay and Hall case study of the Red River need also to be incorporated in Maltais' literature review table – but perhaps as a preamble because they contain over-arching themes. For example, the first recommends that emergency planning organizations be encouraged to support research on vulnerable populations such as seniors, single older women, and women caregivers and to establish a database of such studies. The purpose would be to gather sufficient evidence to actively combat the tendency, evident at the time of the Manitoba flood and still with us today, to treat disaster impacted populations as if they were homogeneous. Flowing from this, their second recommendation is to plan for sub-populations other than just on a geographic basis. Rather, consideration should be given to such determinants of vulnerability as age, gender, culture and ethnicity. Their third recommendation, already mentioned above, is to include seniors in pre-disaster planning. Recommendation four expands beyond individual seniors to draw attention to the need for cooperation and collaboration between the emergency management sector and seniors' organizations. The fifth and final recommendation returns again to research and underscores the need to determine, by examining many more case studies, whether the identified impacts on seniors "were unique either to the hazard or the socio-economic setting or if the lessons were unique to seniors at all".

Conclusion

The four Canadian case studies that are the subject of this synthesis represent an important addition to the literature on seniors and emergencies. Echoing the last recommendation in the set presented by Lindsay and Hall, it is especially important to determine which impacts are unique across hazards, borders and boundaries and victim sub-groups. And, as advocates for seniors, to draw attention to the fact that several factors can increase vulnerability. As the National Advisory Council on Aging (2006, page 3) points out, these include:

> 1) Limited social contact - Studies show that seniors who have few contacts, most often as a result of living alone or in rural areas, are the least informed about impeding emergencies and are likely to miss community warnings. Once a disaster strikes, reduced mobility, dependence on caregivers and medications, unfamiliarity with emergency procedures, and even an unwillingness to leave pets or belongings behind, can contribute to keeping seniors in their homes when it's safer to evacuate. Following a crisis, seniors may not seek out or accept financial or mental health assistance because of the stigmas associated with such help or because they believe that these services are intended for others with greater needs.
>
> 2) Disabilities - Since disaster situations can be very demanding, any diminished physical ability or sensory perception adds to a person's vulnerability. Mobility impairments, hearing loss, even a diminished sense of taste can place seniors at higher risk during emergencies.
>
> 3) Frailty - The frail elderly, many of whom are living with chronic physical or mental conditions, have a greater vulnerability to injury and death during and following a disaster. Dependence on a caregiver or on life support equipment can put seniors at even greater risk during power outages or when roads are closed.

While for many of us who are seniors advocates the above factors are obvious, a 2005 survey by HelpAge International (2006) of 15 UK-based humanitarian aid agencies to determine their policies and practices relating to older persons in emergencies indicated that for the majority they were not.

The HelpAge International report notes:

> While most were keen to emphasize that older people were not excluded from their programmes, they acknowledged that they did not directly target them either. Of the 15 agencies, 14 had no direct policies or procedures for older people. ...Two-thirds did not systematically include older people when disaggregating data. Agencies made assumptions about older people – that they were passive beneficiaries, that specialist agencies were dealing with older people's issues, or that older people were covered by their own agency's programmes.

It is important that actions be taken with respect to ensuring that a similar situation is not the case in this country among NGOs as well as municipal officials and other key individuals and agencies involved in the preparation for and management of emergencies and disasters – both natural and man-made.

Towards this goal, the recommendations articulated by HelpAge International (2006) should be strongly endorsed. These are:

> **Protect** older people by including them as a vulnerable group **Include** older people by breaking down data by age and gender, and ensuring older people's participation in all stages of the project cycle **Mainstream** older people's concerns into organizational policies, and train humanitarian aid staff in ageing issues **Resource** practical programmes and research

According to Center for Research on the Epidemiology of Disasters (cited in Braine 2006) from January to October 2005, an estimated 97,490 were killed in disasters globally and 88,117 of them in natural disasters. The number of natural disasters – floods, windstorms, droughts and geological disasters – recorded since 1900 has increased and number of people affected by such disasters has increased since 1975. There is no reason to believe that these trends will not continue. Coupled with the increase in the number of seniors that will occur as our baby-boom generation ages, the time is now to ensure that those seniors who need assistance get it in the most appropriate, cost-effective and efficient manner possible.

References

Braine, T (2006). Was 2005 the year of natural disasters? Bulletin on the World Health Organization, 24 (1), 4-6.

Burton, R.I., Kates, R.W. and White (1978). *The environment as hazard*. New York: Oxford University Press.

Cox, R. (2006). *Older persons in emergency and disaster situations: a case study of British Columbia's Firestorm 2003*. Paper prepared for the Public Health Agency of Canada.

Ferraro, F.R. (2003). Psychological resilience of older adults following the 1997 flood. *Clinical Gerontologist*, 26, 139-143.

Friedsam, H.J. (1962). Older Persons in Disaster. In G.W. Baker and D.W. Chapman (eds.), *Man and Society in Disaster*. New York: Basic Books, p. 151-182.

Havens, B. and M. Hall (1999). *Experience of Older Manitobans with the 1997 Red River Flood.* Winnipeg: Report prepared for Manitoba Health.

HelpAge International (2006). Neglect in emergencies. *Ageing and Development,* 19, 1.

Hutton, D. (2006). Older people in emergencies: a framing document for policy and program development. Paper prepared for the World Health Organization.

Knight, B. G., Gatz, M. and Heller, K. (2000). Age and emotional response to the Northridge Earthquake: A longitudinal analysis. *Psychology and Aging, 15,* 627-634. Lindsay, J. and Hall,

M. (2006). *Older persons in emergency and disaster: A case study of the 1997 Manitoba flood*. Paper prepared for the Public Health Agency of Canada.

Maltais, D. (2006a). *Impact of the July 1996 floods on older persons in Quebec's Saguenay region.* Paper prepared for Public Health Agency of Canada.

Maltais, D. (2006b). *The ice storm and its impact on seniors.* Paper prepared for the Public Health Agency of Canada

Maltais, D. (2006c) – Recommendations from 18 papers concerned with seniors and disasters. Summary table prepared for the Public Health Agency of Canada

Maltais D., Robichaud S. and Simard A. (2001). Conséquences des inondations de juillet 1996 sur la conception du chez-soi et la santé biopsychosociale des préretraités et retraités. *Canadian Journal on Aging*, 20(3), 407-426.

Maltais, D., Robichaud, S. and Simard, A. (2001). Les conséquences de la tempête de verglas sur la santé biopsychosociale de familles, personnes âgées et agriculteurs sinistrés en fonction du mode d'habitat, GRIC, UQAC.

National Advisory Council on Aging (2006). Recognizing seniors' vulnerability. *Expression*, 19 (3), 3.

Ollendick, D.G. and Hoffmann, Sr. M. (1982). Assessment of Psychological Reactions in Disaster Victims. *Journal of Community Psychology*, 10, 157-167.

Tobin, G.A. and Ollenburger, J.C. (1996). Predicting Levels of Postdisaster Stress in Adults Following the 1993 Floods in the Upper Midwest. *Environment and Behavior*, 28(3), 340-357.

APPENDIX 1: SUMMARY OF CASE STUDIES

A. Saguenay Flood (Quebec, Canada), July 1996

Destructive flood in terms of property/infrastructure damage. 16,000 had to be evacuated (people who lived near rivers, streams and unstable areas vulnerable to landslides or cut off from access). Of these at least 2,000 were older people.

1. Physical Characteristics

- *Magnitude*: large -peak natural flow into Lake Kenogami was 2,364 cubic meters per second.
- *Frequency*: not stated in the case study report.
- *Speed of Onset*: rapid - over a period of 50 hours, 150-279 mm of rain fell on rivers, reservoir and ground water already high because of greater than normal rainfall in the previous 3 weeks.
- *Temporal Spacing*: spring floods are a regularly occurring hazard.
- *Duration*: long –
- *Geographic Extent*: Saguenay-Lac-Saint Jean is 3rd largest of Quebec's official administrative regions encompassing 49 municipalities.
- *Total Population Impacted*: the total population of the Saguenay-Lac-Saint-Jean Region is 286,649. A total of 172,345 live in the Saguenay portion of the region which was hardest hit; of these 18,300 (10.6%) were aged 65+; most older persons lived in private households; over half had incomes below the low-income threshold.

2. Impact on the General Population and on Older Persons

- 426 primary residences destroyed/declared a total loss, 2,015 primary residences damaged. Compensation claims also filed for 694 secondary residences, 575 private businesses and 267 farming operations.
- Major damage to 3 regional highways, bridges and access roads leaving several cities and villages isolated.
- Domestic sewage and water lines damaged; 13,000 left without power due to damage to power grid.
- Total damage estimated at $285 million CAN. Losses plus costs of re-building estimated at $1 billion +.
- No deaths among seniors [No information given in this report but other sources report 10 deaths in total population as a result of mud slides].
- Negative impacts on seniors perceived by health professionals included: emergence of new physical health problems (e.g. high blood pressure, physical exhaustion; stomach and respiratory problems); mental health problems (e.g. psychological distress, stress, psychological exhaustion, post-traumatic stress symptoms); financial burden (debt) as well as changes in the timing of life events (e.g. postponement of retirement; marital tension and family conflict; and giving up leisure activities).
- Negative impacts reported by older persons themselves included: fatigue; sleep difficulties; fear of theft and vandalism; fear of being flooded again; feeling less financially secure (some had to take out a mortgage or otherwise incur debt to cover the costs of repairing their damaged home); having a reduced quality of life as a result of losing a home/residential environment that they enjoyed and/or engaging in fewer leisure activities because of strained financial circumstances.
- Follow-up conducted eight years after the flood showed significant differences in post-traumatic stress disorder symptom scores and depression scores of older adult flood victims compared with non-victims.

3. Emergency Preparedness and Response: Strengths and Gaps

"The people of the Saguenay had experienced two major natural disasters in the past [a landslide in 1971 and an earthquake 1988], and as a result, when the July 1996 floods struck, the region's municipalities already had emergency response plans in place for dealing with such events."

- Emergency preparedness committees had been established in all affected municipalities
- 16,000 people evacuated (including at least 2,000 older people)
- 15 service centres for disaster victims established; some stayed open for one day others for 21 days.
- Re older persons: Their "Fire safety cover plan" identified group homes whose residents were vulnerable because of physical, cognitive or mental health problems, old age or limited mobility.
- In one rural community volunteers working with CLSC professionals to provide a number of basic health and social services to older flood victims (e.g. took them to doctors appointments, monitored their blood pressure and blood sugar, and made sure they took their prescription medications) and assisted them in applying for compensation.
- Home visits made to all seniors in 2 rural communities.
- Red Cross provided in-home support for older persons
- Gaps: Some older persons reported difficulties regarding temporary shelter (e.g. lack of privacy, water, electricity).

4. Recovery: Strengths and Gaps

- Problems identified by older persons included the complex procedures involved in applying for financial compensation.
- Some older flood victims said that it was upsetting to have lost all their clothes or to have been unable to recover them quickly; other found the necessity of frequent travel/having to make multiple moves (e.g. from emergency shelter or home of family member to one or more rental units) problematic.

5. Contributions of Older Persons

- In one flooded rural community, older persons were recruited by social workers to serve as volunteers at a day care service established in cooperation with a CLSC.
- In one village, older flood victims established and ran a committee that provided technical and moral support to flood victims and defended their interests in dealing with various levels of government.
- Many older persons provided shelter for periods ranging from a few days to several weeks for their children or grandchildren who had been evacuated from their flooded homes.
- Some seniors who were not flood victims worked as volunteers for community agencies such as St. Vincent de Paul and the Red Cross and in the evacuee shelters.

"Generally, older flood victims were seen more as beneficiaries of recovery operations than as partners in carrying them out, but some older persons who belonged to community agencies involved in managing the crisis did contribute to these operations."

6. Unexpected Outcomes

- Some older persons reported having to cope with their neighbours' jealousy or prejudices with regard to the financial aid they had received as flood victims.
- A two year-follow up of victims found that those who felt that they had received less help than they had hoped for were struggling with more difficult life conditions than non-

victims or victims who were satisfied with help given. Dissatisfied older flood victims had more negative perceptions of their physical health and had more fragile mental health than the other two groups and had fewer social outings. Several other researchers are reported to have found a similar relationship. Kaniasty and Norris (1995) contend that disaster victims who regard the help that they have received as inadequate also expect that they will not get the support that they think they need in future and so, they continue to experience high levels of psychological distress.

7. Best Practices

- The author recommends that authorities managing emergency response be made aware of the risk factors of older persons having negative feelings about the help that they receive so that greater attention can be devoted to them.
- The paper includes a series of general recommendations from professionals on preventive steps to take when implementing emergency response measurers. These are followed respectively by recommendations to disaster victims, individuals not directly affected by a disaster, and to municipal authorities. A parallel set of recommendations derived from older persons is also included.

8. Data Source

- D. Maltais - Experienced gerontological researcher who has conducted several studies comparing elderly Saguenay flood victims and non-victims.

B. Red River Flood (Manitoba, Canada), April-May 1997

Large flood, anticipated and prepared for well in advance.

1. Physical Characteristics

- *Magnitude*: peak natural flow (163,000 cubic feet per second), just slightly below the design capacity of the flood mitigation measures in place (169,000 cfs).
- *Frequency*: flood of this magnitude is expected only about once every 90 years
- *Speed of Onset*: slow – foreshadowed by heavy winter snowfalls and forecast as early as January.
- *Temporal Spacing*: the potential for flooding is year round in Manitoba.
- *Duration*: long – several weeks to months in some areas. [Impact began after April 5-6 blizzard; Red River and tributaries overtopped their banks by April 20, Red River crested in Emerson, Manitoba, April 27 and in Winnipeg May 2.]
- *Geographic Extent*: at its peak, the flooded Red River was 40 km wide with over 200,000 hectares or approximately 1,900 square kilometres across 18 rural municipalities under water. [The Winnipeg Floodway and a system of riverbank dykes, which required extensive temporary sandbag upgrades, protected the City of Winnipeg.]
- *Dispersion*: generally areas near the river, except for ring-dyked towns or properties with other protection, experienced very similar damage.

"Rare large magnitude occurrence of a seasonal, slow-onset hazard with widespread, disperse damage over a long duration."

2. Impact on the General Population and on Older Persons

- 28,000 people were relocated including 147 evacuated from a personal care home and hospitals in small communities.
- There appear to have been no deaths or injuries to seniors directly attributable to the flood.
- Eight months post-flood interviews were conducted with 102 rural Aging in Manitoba (AIM) study participants aged 75+ who had been interviewed 8 months before the flood. Of these 26% were not personally affected (Group 1); 40% were affected through their community or others (Group 2), and 33% had been at risk of evacuation, experienced property damage, were evacuated or experienced a loss of home (Group 3). Health service utilization was compared with two control groups drawn from non-flood-affected AIM 96 respondents. In their narratives of their flood experience, some respondents in Groups 2 and 3 spoke of stress and worry. Those who were evacuated experienced anxiety both because of the move itself and from not knowing what the situation would be like when they returned. Temporary moves often caused disruptions in routines, affecting sleep, and eating and activity patterns for some. However, only a few respondents, all in Group 3, felt they had any long-term ill effects caused by the flood.
- Logistic regression performed on pre-post flood measures showed gender to be the best predictor of ADL decline, while level of social support was the only significant predictor of IADL decline. Contrary to what one would expect and consistent with the results of the bi-variate analyses, the multivariate analyses showed that those who were evacuated where the least likely to show cognitive decline. Those who were evacuated also showed less decline in self-rated health.
- In 2001, 69 of those interviewed in 1998 were re-interviewed. None felt that their current health conditions were related to the flood experience and none said that they were still experiencing any problems related to the flood such as housing repairs, financial problems or family disruptions.

3. Emergency Preparedness and Response: Strengths and Gaps

"Manitoba communities impacted or threatened in 1997 have a long history of floods…Major flood control measures …were implemented as a result of the 1950 flood. The success of these measures was apparent in the 1979 and 1996 floods where damage within Winnipeg was significantly less than it would have been given the water levels if not for the mitigation efforts."

- City of Winnipeg had well developed emergency response programs prior to 1997 flood; degree of preparedness varied among the smaller municipalities. [Legislation has been strengthened since the flood to ensure these obligations are met.]
- The Manitoba Emergency Measures Organization (MEMO) maintains the Manitoba Emergency Plan that outlines its own responsibilities and those of other provincial departments such as Health and Natural Resources.
- In January when the flood threat became apparent, MEMO and several other departments reviewed and updated their plans. After the April snowfall, a Flood Committee consisting of key government departments was established.
- During the 1997 flood, MEMO coordinated the activities of government departments with the response needs of the various local authorities. The issue of evacuation orders, especially the decision to order them and the power to enforce them, was a major concern during the flood. [Legislation now requires the use of incident management systems and a greater role for the Office of the Fire Commissioner.]
- The federal government was represented by Emergency Preparedness Canada (now Public Safety and Emergency Preparedness Canada) which oversaw how federal responses, such as the Canadian Forces, could contribute.
- City of Winnipeg issued 75 News Releases and 41 Public Service Announcements (PSA) during the flood.
- • None of the News Releases or PSAs was targeted to seniors or other vulnerable populations. While some News Releases during the evacuation suggested that consideration be given to early evacuation of people "with special needs", no details were provided concerning types of special needs and no data were collected on whether particular groups received the information or on the effectiveness of it.
- There was some confusion as to who was responsible for relocating and transporting people from hospitals, nursing homes, group homes and other provincial facilities. [City of Winnipeg subsequently recommended that "the appropriate City authority review guidelines and procedures for evacuation of these types of facilities.]

4. Recovery: Strengths and Gaps

- The MEMO played the lead role during the recovery period through its responsibilities for financial assistance.
- NGOs (e.g. Canadian Red Cross, Salvation Army, Mennonite Disaster Services) cooperated with the provincial Department of Family Services and Housing in providing emergency social services during and after the flood. [Subsequently, these organizations have developed more formal protocols for coordinating their contributions].

5. Contributions of Older Persons

- The AIM follow-up indicated that some older people, especially those in Group 2, helped out by providing cooking and baking for the volunteers, donating money and clothing, helping in the local personal care homes, hauling sand bags, and helping with fundraising events. One woman who stayed with family in Winnipeg went daily to visit and provide cheer to other evacuees from her community who were temporarily housed in a Winnipeg hotel.

6. Unexpected Outcomes

- Bivariate and multivariate analyses of the quantitative data showed that the level of flood experienced was a strong predictor of change in cognitive status with those who were evacuated being the least likely to have declined.
- Similarly, those who were evacuated expressed less of a decline in self-perceived health.
- There were no significant differences in health care utilization between the victims and the two control groups.

7. Best Practices

- The AIM narratives suggest that in planning for future older flood victims, mechanisms should be included to help people cope with the stress of the event and possible evacuation. Attempts should be made to assist people in maintaining their normal daily lifestyles.

8. Data Source

- J. Lindsay, a university-based expert in disaster and emergency studies, and M. Hall, co-principal investigator with Betty Havens in one of the landmark studies of disaster impact on older adults.

C. Ice Storm (Quebec, Canada), January 1998 2-pronged disaster: major ice storm and the power blackout that followed

1. Physical Characteristics

- *Magnitude*: large
- *Frequency*: ??
- *Speed of Onset*: between January 5-9, when average temperature was -9ºC, the area received equivalent of 100 mm of rain.
- *Temporal Spacing*: a regularly occurring hazard.
- *Duration*: storm lasted 4 days; power outage lasted from several days to up to a month in some parts of the province.
- *Geographic Extent*: all or parts of 9 administrative regions in Quebec totalling 48,600 square kilometres and encompassing more than 600 municipalities.
- *Total Population Impacted*: 4,826,586 (66.9% of population of Quebec). The area most severely affected was the Montérégie region, a highly urbanized region, composed of 200+ municipalities plus some large rural areas; total population:1,243,335; 128,960 (10.3%) aged 65+.

2. Impact on the General Population and on Older Persons

General Population

- At the peak of the disaster 30,000 businesses forced to close, one-third for periods exceeding 10 days.
- 2.2 million days of work lost.
- 500,000 claims filed for damage to homes and personal property.
- Total damage estimated at $2.58 billion not including $15 million in lost wages.

According to Faucher (2002), ice storm was classified by Swiss RE Company as 38th most costly world event in terms of insured losses.

- 30 deaths in Quebec directly linked to the ice storm: 15 were aged 65+; of 18 deaths in Montérégie region, eight were 65+ and five were 55-64.
- General increase in mortality rates in January and February 1998 compared to same months in 1997. The increase in mortality was greater among seniors.
- In first 9 days of the storm, 45 people in Montérégie region suffered severe carbon monoxide poisoning after improperly using generators, stoves and faulty heating devices; in total, 700 cases affecting 1,000 persons (60% from Montérégie) were reported to the provincial poison control centre.
- 38% increase in hospitalizations in the region for infectious disease, 21% increase in respiratory problems, 20% increase in traumatic injuries, increased use of ambulances and emergency rooms.
- 30% of ice storm victims who remained in their own homes used appliances or devices that posed a risk including: wood stoves, oil lamps, fireplaces, camp stoves, liquid-fuel-fired heaters, barbecues and fondue sets. One-quarter to one-third of seniors who had generators and combustion appliances used them incorrectly; only 14.7% of seniors had carbon monoxide detectors in their home. Other risky behaviour engaged in by seniors during the ice storm and its aftermath included scraping ice off their roof (26.7%), pruning trees (25.4%) and eating perishable foods that had been left non-refrigerated (5%).
- While seniors who remained in their own home mainly experienced physical health problems, those who resided in shelters tended to develop both physical and psychological problems.

3. Emergency Preparedness and Response: Strengths and Gaps

- Municipalities opened 454 relief centres; on the busiest day, they gave shelter to 17,800; 140,000 people in total spent at least one night in a shelter.
- Emergency preparedness varied considerably across municipalities. Some did not have an emergency response officer nor had they conducted disaster simulations or emergency response exercises. Varying proportions (21% to 86%) across the five categories of municipalities based on size had a standing emergency response committee. Most did not have an emergency response plan adequate to deal with a situation of the magnitude of the ice storm.
- Health and social service agency plans were outdated, inadequate and poorly coordinated with the response plans of the municipalities.
- Municipalities and the various stakeholders involved in implementation of emergency measures were largely unfamiliar with regional emergency response plans.
- All of the 10 acute care hospitals in the region had both an external emergency plan (to deal with a large influx of victims) and an internal plan (to evacuate patients in the event of a fire or other disaster). Half of the hospitals opened shelters for frail or ill seniors.
- As soon as the ice storm hit, CLSCs contacted their home support clients. Those without adequate resources or housing were referred to residential and long-term care centres (CHSLDs) and hospitals. However, conditions in the CHSLDS were less than optimal. For instance in one community, 130 seniors had to sleep in cots in a crowded CHSLDS gymnasium where conditions left much to be desired in terms of comfort and hygiene.
- Commonly, the system for locating vulnerable individuals was inadequate, due to incomplete or outdated records. "When police began to discover a number of individuals in distress, CLSC staff realized that many people who should have been receiving home support services had slipped through the cracks. It was also difficult to reach home support clients who had left their homes, since appropriate links had not been established between the CLSCs, municipal housing authorities and service organizations working with disaster victims."
- Clients could not be accommodated or served in other ways at the CLSCs themselves because most had no generators and therefore no auxiliary heating or lighting; most were forced to close.
- There was a lack of coordination between municipalities and the CLSCs and, a number of the relief centres were poorly organized. There were problems with intake and triage, with people being sent to centres with little regard for their individual needs. Due to shortage of beds, some seniors had to sleep on the floor, they were mixed with infants and children, and there was poor sanitation and a lack of cleanliness.
- Most of the 17 publicly funded and 22 privately funded residential and long-term care centres for the frail elderly (CHSLDS) did not have internal emergency response plans.

4. Recovery: Strengths and Gaps

5. Contributions of Older Persons

- Some seniors affected by the disaster served as volunteers, helping workers in shelters.
- Some, who were able to get a generator, gave shelter to their children and grandchildren
- Generally, seniors were viewed as clients rather than collaborators

6. Unexpected Outcomes

- Some seniors who left their homes worried about the fate of their pets. Some remained at home to care for their pets, sometimes putting their own health in jeopardy in the process.

7. Best Practices

- Among recommendations made by the author are to group people by age in shelters; keep spouses together; ensure access to health services and adequate food in shelters; have law enforcement personnel present.
- Tables are included containing seniors' recommendations to their peers, responders, municipalities and government.

8. Data Source

- D. Maltais - Knowledgeable gerontological researcher who conducted several studies of the impact of the ice storm on the health of the older population of Montérégie.

D. Firestorm 2003 (British Columbia, Canada), August 2003

1. Physical Characteristics

- Wildfires and interface fires (i.e. fires that occurred at the boundaries between wilderness and human settlements) that caused massive disruption that included large-scale and repeated evacuations, property loss, economic losses, job loss, loss of domestic animals and livestock, and the destruction of large tracts of range and wilderness land.
- *Magnitude*: large – 2,500 wildfires and 15 interface fires
- *Frequency*: largest such disaster in BC in 50 years.
- *Speed of Onset*: Two interface fires that are the focus of this case study: the McLure fire that affected the two communities of Barriere and Louis Creek, and the Okanagan Mountain fire that affected the city of Kelowna. The McLure fire was started by a cigarette carelessly discarded several days before the August 1 evacuation date, in McLure, a town approximately 20 miles south of Barriere and Louis Creek. The Okanagan Mountain fire was started by a lightening strike on August 16 that spread over the next four days to the outskirts of Kelowna.
- *Temporal Spacing*: well above seasonal average of 2,000 wildfires and one interface fire per year.
- *Duration*: Barriere and Louis Creek – short – Louis Creek destroyed by mid-day August 1; Kelowna – 6 weeks – from August 22 when first evacuation took place, through a second wave of evacuations at end of August and in first week in September, until October when fire activity finally ceased.
- *Geographic Extent*:
- *Total Population Affected*: Case study focuses on McLure and Okanagan Mountain fires. Population in the area of the McLure fire, which encompassed the unincorporated towns on Barriere and Louis Creek, was approximately 3,200. Number of seniors is not given but is described as significant, with a recent influx of retired and semi-retired people reported. Okanagan Mountain fire threatened city of Kelowna, population 109,000, 18% of whom are 65+.
- *Dispersion*:

2. Impact on the General Population and on Older Persons

- McLure fire virtually destroyed the town of Louis Creek.
- 45,000+ evacuated; 30,000+ of them from Kelowna – the largest single evacuation in BC history.
- Destroyed 334 homes, many small businesses, a regionally important lumber mill, and approximately 160,000 hectares (1,600 square miles) of range and forestland; estimated value of forest land destroyed $5.6 billion CAN. Damage costs in Kelowna are not specified.
- Power was out in Barriere for two days and smoke filled the valley.
- No deaths among Kelowna home care clients and none went to hospital emergency departments or required relocation to a shelter provided through Emergency Social Services (ESS). However, the part of the city evacuated was the most affluent part of the city.
- While there was an increase in the rate of flu and colds, and some depression 6 weeks after the evacuation of 100 nursing home patients, only two deaths occurred that may have been attributable to the relocation, one of these in a resident receiving palliative care at the time of the evacuation.

"The story might have been different if the fire threatened some of the apartments in Kelowna that house low-income seniors who may not have support networks and resources available."

3. Emergency preparedness and response. Strengths and Gaps

- In BC, the emergency response system relies heavily on volunteers and voluntary organizations under the umbrella of ESS. The Barriere ESS had 14 members at the time of the fire but only 6 of them, all older adults, participated in the evacuation.
- The ESS team set up a reception centre in a school and registered hundreds of evacuees from further south. Local search and rescue volunteers went door-todoor to deliver evacuation notices.
- Good response by home care staff in Kelowna. When the city was placed on evacuation alert, they identified clients who would need assistance and drafted interview forms for staff; later, case managers prepared clients for potential evacuation. Additional beds added to local care facility. Ventilator-dependent clients identified early.
- Identification of clients was challenging, because electronic records were not accessible by geographic location and files had to be searched manually.
- Report states that "a significant proportion" of population of Barriere and Louis Creek were low-income, and did not have transportation. They were to be transported by school bus from the reception centre to 100 Mile House. However, buses could not get through because of the fire's path and roadblocks.
- Few seniors had a plan of what they would take with them in the event of an emergency evacuation; much of the focus in rural setting of Barriere and Louis Creek was on saving companion and domestic animals.
- Challenges particularly in the urban setting of Kelowna included interruptions and difficulties in the delivery of home care and other services, cancellation of elective surgeries, and the provision of accurate and timely health and service related information.

4. Recovery: Strengths and Gaps

- In the early stages of recovery, while residents of Barriere and Louis Creek were returning home, the regional health authority personnel were focusing their attention and resources on other active fires in the region.
- No gathering place in Louis Creek; had to meet in Barriere where losses were different – mostly economic whereas Louis Creek people lost their homes.
- Many of the homes were uninsured; large public response to the disaster resulted in a large relief fund a significant portion of which was designated for purchase of building material for uninsured home-owners.
- Communication obstacles: Older people had difficulty securing permits, doing other things necessary to rebuild since they did not have cell phones and were unfamiliar with computers and Internet. Further, they had to travel to Barriere to access these. Literacy was a problem for some.
- Transportation obstacles: recovery required them to travel between where they had temporarily been relocated, Louis Creek, and government offices in Kamloops which was problematic because as noted above many did not own a car.
- Cultural disconnect: non-residents controlled much of the recovery process and were unaware of local needs and customs.
- Gender split: decision makers in the longer-term recovery process were mostly male and disaster-related resources were focused mainly on job creation. Female and/or informal care-givers psychosocial needs were largely invisible and ignored.

5. Contributions of Older Persons

- During the evacuation period, some older persons were the backbone of the ESS effort; others focused mainly on helping their own immediate family.
- During the recovery, some older adults provided advice and assistance (e.g. retired building inspector helped assess damage to burned buildings and advice on rebuilding); others were called on for information – for example re: pre-fire location of wells, fences, property lines; others assisted with job creation and business and economic development.

6. Unexpected Outcomes

- Offer of assistance with evacuation and with temporary placement of residents by Interior Health Authority staff to operator of a small (6 bed) private home for frail elders in Barriere.
- Some family members took their relatives from the care facility when it was announced that it would be evacuated, without realizing what would be involved in caring for them.
- Relocation of the care facility residents from Kelowna to Vernon, where there was no fire or state of emergency, meant that the level of support available from ESS was much less than had they remained in Kelowna.

7. Best Practices

- Store front clinic set up in Kamloops where many of the Barriere and Louis Creek residents were relocated. Staffed by medical personnel from the Barriere Health Centre, the clinic provided displaced residents with continuity of care and a meeting place. An issue of the local paper produced during this time also was helpful to evacuees in maintaining their sense of community.
- In Kelowna, information about air quality posted on the regional health authority's website was helpful to seniors.
- There was also effective engagement in Kelowna between emergency managers and the main-stream media, allowing consistent and accurate updates to be communicated.
- In the nursing home evacuation, staff transferred with the residents, keeping the psychosocial environment and care routines constant and familiar. The taking of residents' beds and the efficiency of preparing them for transport was also considered a "best practice". The latter included noting the patient's name on masking tape placed on the bed, placing a bag of medications on the bed as well as the patient's chart, and securing these with the bed covers. (Getting the right bed to the right temporary shelter did however prove problematic as they were transported to two different facilities and the residents did not arrive in the same order in which their beds were unloaded.)

8. Data Source

- R. Cox, a doctoral candidate at the University of Victoria who conducted a 2-year ethnographic study of residents of Barriere and Louis Creek and interviewed older adults and health care providers in Kelowna.

APPENDIX 2 PRE- AND POST-STUDIES OF SENIORS IN DISASTER SITUATIONS			
Author/date	**Type of Disaster**	**Study Population**	**Findings**
Brennan, Horowitz and Reinhardt (2003)	**2001 Sept. 11 Attacks in USA**	**584 older adults with age-related vision loss in an ongoing 5 yr. longitudinal study**	**Non-significant impact on CES-D scores and life satisfaction**
Canino, Rubio Stipec and Woodbury (1990)	**1985 Puerto Rico Flood**	**376 aged 20-68 who had participated in mental health survey, 77 exposed and 298 unexposed.**	**Major depressive symptoms more common in group 17-24 than among those 45-68.**
Gignac, Coff and Badley (2003)	**1998 Canadian Ice Storm**	**59 older osteo-arthritis/osteoporosis patients and 54 matched controls in a longitudinal study**	**Ss exposed to ice storm reported significantly > changes in disability and pain than controls 1.5 yrs later.**
Havens and Hall (1999)	**1997 Manitoba Flood**	**102 aged 75+ from Aging in Manitoba longitudinal study**	**60% reported increase in no. of chronic illnesses from pre-to post flood but no diff. in functional status of flood victims and controls.**
Kilijanek and Drabek (1979)	**1966 tornado Topeka, KS**	**138 victim families and matched non-victim families, all participants in a Menninger Foundation study - <39 yrs. N=170; 40-59 N=247; 60+ N=248**	
Knight, Gatz and Bengston (2000)	**1994 Northridge California Earthquake**	**152 adults aged 30 102 participating in Longitudinal Study of Generations**	**Although age effects on depressed mood were founds (CESD scores) they were present before as well as after the earthquake.**

			Inoculation hypothesis was supported for depressed mood.
Lin et al (2003)	**1999 Chi-chi Earthquake in rural Taiwan**	**268 older adults interviewed coincidently just before the earthquake**	**Ss reported lower QOL in ¾ domains in 28-item WHOQOL-BREF 12 mo. Post quake.**
Norris and Murrell (1988)	**1981 and 1984 floods in southeast Kentucky**	**234 participants in panel study, 130 lived in counties flooded in 1981 and 1984; 83 in those flooded in 1981 or 1984; 21 not flooded. All were 55+.**	**Significant differences between those with and without prior flood experience**
Phifer (1990)	**1984 Southeast Kentucky flood**	**222 aged 55+ participants in a panel study, 44 exposed and 178 unexposed**	**Men, persons with lower SES and those 55-64 were at sig. Greater risk for psychological symptoms.**
Phifer, Kaniasty and Norris (1988)	**1984 Southeast Kentucky flood**	**222 aged 55+ participants in a panel study, 37 exposed to 1981 flood and 44 exposed to 1984 flood**	**Physical health worse post-disaster with greater flood intensity associated with more persistent health effects.**
Phifer and Norris (1989)	**1981 and 1984 Southeast Kentucky flood**		
Tyler and Hoyt (2000)	**1993 US Flood**	**651 participants aged 54 and over in Iowa Health Poll**	**For young-old (54-69) pos. assn between flood exposure and post-flood depression**